ELSEVIER

Volumes 313–314, Numbers 1–2, February 1998

thin solid films

Contents of Volumes 313–314

Preface ... xi

Chapter 1. Plenary Reviews

Spectroscopic ellipsometry: a historical overview*
K. Vedam ... 1

Ellipsometric investigations of piezo-optical effects*
M. Cardona, D. Rönnow and P.V. Santos ... 10

Chapter 2. Advances in Ellipsometric Instrumentation; Error and Data Analysis

Advances in multichannel spectroscopic ellipsometry
R.W. Collins, I. An, H. Fujiwara, J. Lee, Y. Lu, J. Koh and P.I. Rovira ... 18

Spectroscopic ellipsometry data analysis: measured versus calculated quantities*
G.E. Jellison, Jr. ... 33

Evaluation of interferometric ellipsometer systems with a time resolution of one microsecond and faster
K. Hemmes, M.A. Hamstra, K.R. Koops, M.M. Wind, T. Schram, J. de Laet and H. Bender ... 40

Complete Mueller matrix measurement with a single high frequency modulation
E. Compain, B. Drevillon, J. Huc, J.Y. Parey and J.E. Bouree ... 47

Spectrophotopolarimeter based on multiple reflections in a coated dielectric slab
R.M.A. Azzam, A.M. El-Saba and M.A.G. Abushagur ... 53

Broadband spectral operation of a rotating-compensator ellipsometer
J. Opsal, J. Fanton, J. Chen, J. Leng, L. Wei, C. Uhrich, M. Senko, C. Zaiser and D.E. Aspnes ... 58

Development of a phase-sensitive ellipsometer and application to the real time analysis of chromogenic WO_3 films during the coloration process
E. Masetti, S.E. Segre and S. Bosch ... 62

Spectroscopic ellipsometry with compensator and X-ray specular reflectivity for characterization of thin optical layers on transparent substrates
F. Bertin, A. Chabli, E. Chiariglione, F. Burdin, M. Berger, T. Boudet, O. Lartigue and G. Ravel ... 68

Systematic errors in fixed polarizer, rotating-polarizer, sample, fixed analyzer spectroscopic ellipsometry
S. Bertucci, A. Pawlowski, N. Nicolas, L. Johann, A. El Ghemmaz, N. Stein and R. Kleim ... 73

Simultaneous determination of reflectance spectra along with $\{\eta(E), \Delta(E)\}$ in multichannel ellipsometry: applications to instrument calibration and reduction of real time data
I. An, J. Lee, B. Hong and R.W. Collins ... 79

Spectrogoniometry and the WANTED method for thickness and refractive index determination
J.C. Martínez-Antón and E. Bernabeu ... 85

Effects of depolarization of polarimetric components on null ellipsometry
S.-M.F. Nee and T. Cole ... 90

Depolarization/mixed polarization corrections of ellipsometry spectra
U. Rossow ... 97

Application of the degree of polarization to film thickness gradients
U. Richter ... 102

Measurement of the absorption edge of thick transparent substrates using the incoherent reflection model and spectroscopic UV–visible–near IR ellipsometry
M. Kildemo, R. Ossikovski and M. Stchakovsky ... 108

Multiple sample analysis of spectroscopic ellipsometry data of semi-transparent films
K. Järrendahl and H. Arwin ... 114

Toward a priori selection of ellipsometry angles and wavelengths using a high performance semantic database
F.K. Urban III and D. Barton ... 119

Multiple minima in the ellipsometric error function
S.A. Alterovitz and B. Johs ... 124

* Invited paper

Elsevier Science S.A.

Analysis of general ambiguity of inverse ellipsometric problem
V.G. Polovinkin and S.N. Svitasheva 128
Analytic representations of the dielectric functions of materials for device and structural modeling
J. Leng, J. Opsal, H. Chu, M. Senko and D.E. Aspnes 132
Development of a parametric optical constant model for $Hg_{1-x}Cd_xTe$ for control of composition by spectroscopic ellipsometry during MBE growth
B. Johs, C.M. Herzinger, J.H. Dinan, A. Cornfeld and J.D. Benson 137
Analysis of optical spectra by Fourier methods
S.D. Yoo, N.V. Edwards and D.E. Aspnes 143
A modified learning strategy for neural networks to support spectroscopic ellipsometric data evaluation
L. Rédei, M. Fried, I. Bársony and H. Wallinga 149
A new algorithm for real-time thin film thickness estimation in in situ multiwavelength ellipsometry using an extended Kalman filter
C.G. Galarza, P.P. Khargonekar, N. Layadi, T.L. Vincent, E.A. Rietman and J.T.C. Lee 156

Chapter 3. Optical Properties of Solids and Thin Films from Spectroscopic Ellipsometry
Systematic differences among nominal reference dielectric function spectra for crystalline Si as determined by spectroscopic ellipsometry
K.A. Bell, L. Mantese, U. Rossow and D.E. Aspnes 161
Characterization of highly strained silicon-germanium alloys grown on silicon substrates using spectroscopic ellipsometry
H. Lee 167
Optical properties and band structure of $Ge_{1-y}C_y$ and Ge-rich $Si_{1-x-y}Ge_xC_y$ alloys
K.E. Junge, N.R. Voss, R. Lange, J.M. Dolan, S. Zollner, M. Dashiell, D.A. Hits, B.A. Orner, R. Jonczyk and J. Kolodzey 172
Dielectric function modeling for $In_{1-y}Al_yAs$ on InP
L.I. Kamlet and F.L. Terry Jr. 177
Analysis of ellipsometric and photoemission spectra of diluted magnetic semiconductors by hybridization interaction mechanism
Y.-D. Kim, Y.-C. Chang and M.V. Klein 183
Spectroscopic ellipsometry and low temperature reflectance: complementary analysis of GaN thin films
N.V. Edwards, S.D. Yoo, M.D. Bremser, M.N. Horton, N.R. Perkins, T.W. Weeks, Jr., H. Liu, R.A. Stall, T.F. Kuech, R.F. Davis and D.E. Aspnes 187
Spectroscopic ellipsometry characterization of thin-film silicon nitride
G.E. Jellison, Jr., F.A. Modine, P. Doshi and A. Rohatgi 193
Characterization of the optical properties of PECVD SiN_x films using ellipsometry and reflectometry
L. Asinovsky, F. Shen and T. Yamaguchi 198
Visible and infrared optical constants of electrochromic materials for emissivity modulation applications
J.S. Hale, M. DeVries, B. Dworak and J.A. Woollam 205
Optical properties of lead lanthanum zirconate titanate amorphous thin films
D. Zhu, Q. Li, T. Lai, D. Mo, Y. Xu and J.D. Mackenzie 210
Spectroscopic ellipsometry characterization of $Ba_{0.7}Sr_{0.3}TiO_3$ thin films prepared by the sol-gel method
I. Suzuki, M. Ejima, K. Watanabe, Y.-M. Xiong and T. Saitoh 214
Optical characterization of Ru_2Si_3 by spectroscopic ellipsometry, UV-VIS-NIR spectroscopy and band structure calculations
W. Henrion, M. Rebien, V.N. Antonov, O. Jepsen and H. Lange 218
Theoretical and experimental determination of optical and magneto-optical properties of $LuFe_2$ single crystal
S.J. Lee, R.J. Lange, S. Hong, S. Zollner, P.C. Canfield, A.F. Panchula, B.N. Harmon and D.W. Lynch 222
Ellipsometric study of the influence of the order-disorder phase transition on the optical properties and electronic structures of FeAl alloy films
Y.P. Lee, K.W. Kim, V.N. Antonov, O.V. Krasovska, E.E. Krasovskii, Yu.V. Kudryavtsev, V.V. Nemoshkalenko and B.Yu. Yavorsky 228
The medium-related optical constants of noble metals observed by ellipsometric study
Y. Wang, L.-Y. Chen, B. Xu, W.-M. Zheng, R.-J. Zhang, D.-L. Qian, S.-M. Zhou, Y.-X. Zheng, N. Dai, Y.-M. Yang, K.-B. Ding and X.-M. Zhang 232

Chapter 4. Material and Structure Analysis by Spectroscopic Ellipsometry
Characterization of epitaxial silicon germanium thin films by spectroscopic ellipsometry
C. Ygartua and M. Liaw 237
Influence of roughness and grain dimension on the optical functions of polycrystalline silicon films
A. Borghesi, G. Tallarida, G. Amore, F. Cazzaniga, G. Queirolo, M. Alessandri and A. Sassella 243
Characterization and metrology of diffusion doped polysilicon using ellipsometry
L. Asinovsky, M. Schroth, F. Shen and J.J. Sweeney 248
Surface disorder production during plasma immersion implantation
T. Lohner, N.Q. Khánh, P. Petrik, L.P. Biró, M. Fried, I. Pintér, W. Lehnert, L. Frey, H. Ryssel, D.J. Wentink and J. Gyulai 254
Comparative study of polysilicon-on-oxide using spectroscopic ellipsometry, atomic force microscopy, and transmission electron microscopy
P. Petrik, M. Fried, T. Lohner, R. Berger, L.P. Bíró, C. Schneider, J. Gyulai and H. Ryssel 259

Spectroellipsometric characterization of SIMOX with nanometre-thick top Si layers
T. Yamaguchi, M. Nasu, Z.-T. Jiang, M. Tabe and Y. Kanda 264
Simultaneous measurement of six layers in a silicon on insulator film stack using visible-near-IR spectrophotometry and single-wavelength beam profile reflectometry
J.M. Leng, J.J. Sidorowich, M. Senko and J. Opsal 270
Optical properties of bonded silicon silicide on insulator (S^2OI): a new substrate for electronic and optical devices
V. Nayar, J. Russell, R.T. Carline, A.J. Pidduck, C. Quinn, A. Nevin and S. Blackstone 276
A multi-sample, multi-wavelength, multi-angle investigation of the interface layer between silicon and thermally grown silicon dioxide
C.M. Herzinger, B. Johs, W.A. McGahan and W. Paulson 281
A spectroscopic immersion ellipsometry study of SiO_2-Si interface roughness for electron cyclotron resonance plasma and thermally oxidized Si surfaces
C. Zhao, P.R. Lefebvre and E.A. Irene 286
Optical characterization of silicon dioxide layers grown on silicon under different growth conditions
Y.J. Cho, H.M. Cho, Y.W. Lee, H.Y. Lee, I.W. Lee, S.K. Lee, J.W. Sun, S.Y. Moon, H.K. Chung, H.Y. Pang, S.J. Kim and S.Y. Kim 292
Spectroellipsometric characterization of thin silicon nitride films
Z.-T. Jiang, T. Yamaguchi, M. Aoyama, Y. Nakanishi and L. Asinovsky 298
Characterization of PVD TiN uniformity
L. Asinovsky and L.E. Frisa 303
Characterization of titanium nitride (TiN) films on various substrates using spectrophotometry, beam profile reflectometry, beam profile ellipsometry, and spectroscopic beam profile ellipsometry
J.M. Leng, J. Chen, J. Fanton, M. Senko, K. Ritz and J. Opsal 308
An ellipsometric study of Ni, Mo and Ni_xN films deposited on Si
A.A. Tarasenko, L. Jastrabík, D. Chvostova and J. Sobota 314
Spectral dependence of the complex refractive index shift under the semiconductor-metal transition in thermally-oxidized vanadium
S.N. Svitasheva and V.N. Kruchinin 319

Chapter 5. Anisotropic and Inhomogeneous Solids and Thin Films
Generalized ellipsometry and complex optical systems*
M. Schubert 323
Characterization of inhomogeneous dielectric films by spectroscopic ellipsometry*
J. Rivory 333
Determination of optical anisotropy in calcite from ultraviolet to mid-infrared by generalized ellipsometry
D.W. Thompson, M.J. DeVries, T.E. Tiwald and J.A. Woollam 341
Spectroscopic ellipsometry measurements on an anisotropic organic crystal: potassium acid phthalate
A. Sassella, R. Tubino, A. Borghesi, M.E. Giardini and L. Quadrelli 347
Anisotropic dielectric response and surface aging of mercuric iodide crystal studied by variable angle spectroscopic ellipsometry
H. Yao, J.C. Erickson, L.A. Lim and R.B. James 351
Spectroscopic ellipsometry studies of the optical properties of doped poly(3,4-ethylenedioxythiophene): an anisotropic metal
L.A.A. Pettersson, F. Carlsson, O. Inganäs and H. Arwin 356
A spectroscopic anisotropy ellipsometry study of $YBa_2Cu_3O_{7-x}$ superconductors
A. Michaelis, E.A. Irene, O. Auciello, A.R. Krauss and B. Veal 362
In situ measurement of principal refractive indices of thin films by two-angle ellipsometry
I. Hodgkinson, J. Hazel and Q.h. Wu 368
Rotating-compensator multichannel transmission ellipsometry of a thin-film helicoidal bianisotropic medium
P.I. Rovira, R.A. Yarussi, R.W. Collins, V.C. Venugopal, A. Lakhtakia, R. Messier, K. Robbie and M.J. Brett 373
Spectroscopic ellipsometric characterization of transparent thin film amorphous electronic materials: integrated analysis
K.V. Popov, A.V. Tikhonravov, J. Campmany, E. Bertran, S. Bosch and A. Canillas 379
Characterization of graded refractive index silicon oxynitride thin films by spectroscopic ellipsometry
S. Callard, A. Gagnaire and J. Joseph 384
Composition profiling of graded dielectric function materials by spectroscopic ellipsometry
S. Trolier-McKinstry and J. Koh 389
Spectroscopic ellipsometry characterization of indium tin oxide film microstructure and optical constants
R.A. Synowicki 394

Chapter 6. Ellipsometry for In Situ and Real Time Measurement, Monitoring, and Control of Materials Preparation and Processing
Plasma etching of submicron devices: in situ monitoring and control by multi-wavelength ellipsometry*
H.L. Maynard, N. Layadi and J.T.C. Lee 398
Complementary in-situ and post-deposition diagnostics of thin film semiconductor structures*
C. Pickering 406
A square law for the analysis of real time ellipsometric nucleation and growth data
Y.Z. Hu, C.Y. Zhao, W.X. Gao and E.A. Irene 416

* Invited paper

Atomic scale characterization of the initial stage of hydrogenated silicon growth
T. Nakamura, T. Arai and H. Shirai 420
In situ ellipsometry for monitoring nucleation and growth of silicon on silicon dioxide
C. Basa, Y.Z. Hu and E.A. Irene 424
Real-time monitoring of synchrotron-radiation-excited Si homoepitaxy on Si(100) by spectroscopic ellipsometry
H. Akazawa 430
High-speed, high-accuracy optical measurements of polycrystalline silicon for process control
T.E. Benson, A. Ramamoorthy, L.I. Kamlet and F.L. Terry Jr. 435
In situ spectroscopic ellipsometry for advanced process control in vertical furnaces
W. Lehnert, R. Berger, C. Schneider, L. Pfitzner, H. Ryssel, J.L. Stehle, J.-P. Piel and W. Neumann 442
Evaluation of automated spectroscopic ellipsometry for in-line process control — ESPRIT Semiconductor Equipment Assessment (SEA) project 'IMPROVE'
C. Pickering, J. Russell, V. Nayar, J. Imschweiler, H. Wille, S. Harrington, C. Wiggins, J.-L. Stehle, J.-P. Piel and J. Bruchez 446
An in situ and ex situ ellipsometry comparison of the interfaces of Si and GaAs resulting from therrnal and plasma oxidation
P.R. Lefebvre, C. Zhao and E.A. Irene 454
In situ spectroscopic ellipsometric investigation of vacuum annealed and oxidized porous silicon layers
M. Fried, H. Wormeester, E. Zoethout, T. Lohner, O. Polgár and I. Bársony 459
Real time spectroscopic ellipsometry for characterization of the crystallization of amorphous silicon by thermal annealing
M. Wakagi, H. Fujiwara and R.W. Collins 464
Real time spectroscopic ellipsometry for characterization and optimization of amorphous silicon-based solar cell structures
J. Koh, H. Fujiwara, Y. Lu, C.R. Wronski and R.W. Collins 469
Depth-profiles in compositionally-graded amorphous silicon alloy thin films analyzed by real time spectroscopic ellipsometry
H. Fujiwara, J. Koh and R.W. Collins 474
Adapted wavelength methods for in situ ellipsometry
S. Callard, A. Gagnaire, M.P. Besland and J. Joseph 479
A direct robust feedback method for growth control of optical coatings by multiwavelength ellipsometry
M. Kildemo, B. Drévillon and O. Hunderi 484
Real-time monitoring and control of epitaxial semiconductor growth in a production environment by in situ spectroscopic ellipsometry
B. Johs, C. Herzinger, J.H. Dinan, A. Cornfeld, J.D. Benson, D. Doctor, G. Olson, I. Ferguson, M. Pelczynski, P. Chow, C.H. Kuo and S. Johnson 490
Spectroscopic ellipsometry applied for in-situ control of lattice matched III-V growth in MOVPE
T. Trepk, M. Zorn, J.-T. Zettler, M. Klein and W. Richter 496
In situ ellipsometric monitoring of GaAs surface modifications during plasma processing: chemistry and kinetics
M. Losurdo, P. Capezzuto and G. Bruno 501
Application of real time spectroscopic ellipsometry for the development of low-temperature diamond film growth processes
J. Lee, B. Hong, R. Messier and R.W. Collins 506
In situ ellipsometric diagnostics of multilayer thin film deposition during sputtering
X. Gao, D.W. Glenn and J.A. Woollam 511
Observation of silver film growth using an in situ ultra-high vacuum spectroscopic ellipsometer
S. Kawabata, K. Ishihara, Y. Hoshi and T. Fukazawa 516
Spectroscopic ellipsometry on gold clusters embedded in a Si(111) surface
K. Mümmler and P. Wißmann 522

Chapter 7. Optics of Semiconductors: Surfaces, Interfaces, and Quantum Structures
Present status and capabilities for the theoretical calculation of surface optical properties*
R. Del Sole 527
Epioptics: progress and opportunity*
J.F. McGilp 533
Response of the surface dielectric function to dynamic surface modifications: applications of reflectance anisotropy spectroscopy and spectroscopic ellipsometry*
J.-T. Zettler, M. Pristovsek, T. Trepk, A. Shkrebtii, E. Steimetz, M. Zorn and W. Richter 537
Interface, surface and bulk anisotropies of heterostructures*
T. Yasuda 544
H-terminated silicon: spectroscopic ellipsometry measurements correlated to the surface electronic properties
H. Angermann, W. Henrion, M. Rebien, D. Fischer, J.-T. Zettler and A. Röseler 552
Interpretation of critical point energy shifts in crystalline Si by near-surface localization of excited electronic states
L. Mantese, K.A. Bell, U. Rossow and D.E. Aspnes 557
Ellipsometric study of tellurium molecular beam interaction with dehydrogenated vicinal silicon surfaces
V.A. Shvets, S.I. Chikichev, D.N. Pridachin, M.V. Yakushev, Yu.G. Sidorov and A.S. Mardezhov 561
Adsorption of Ga on stepped Si(001) probed by resonant optical second harmonic generation
S. Chandola, M. Cavanagh, J.R. Power and J.F. McGilp 565
Theory of femtosecond ellipsometry in Ge at 1.5 eV
S. Zollner, K.D. Myers, J.M. Dolan, D.W. Bailey and C.J. Stanton 568

* Invited paper

Linear and non-linear spectroscopy of GaAs and GaP: theory versus experiment
A.I. Shkrebtii, J.L.P. Hughes, J.E. Sipe and O. Pulci 574
Real-time photo-spectroscopic ellipsometry measurement of electric field and composition in semiconductors
R.T. Carline, J. Russell, T.J.C. Hosea, P.J.S. Thomas and C. Pickering 579
Dielectric changes of GaAs surfaces determined using the Kramers-Kronig analysis of surface photoabsorption spectra
K. Uwai, Y. Watanabe and N. Kobayashi 583
Verification of GaAs/AlAs superlattice theory by spectroscopic ellipsometry
D. Mo and J.H. Tan 587
Ellipsometry on monolayer films of InAs and AlAs embedded in GaAs and of InP embedded in GaP
H. Schmidt, B. Rheinländer and V. Gottschalch 590
Spectral-ellipsometric investigations on semiconductor resonators
G. Jungk 594
Ellipsometric studies on semiconductor microcavity IR-detector structures
B. Rheinländer, J. Kováč, J.-D. Hecht, J. Borgulová, F. Uherek, J. Waclawek, V. Gottschalch and P. Barna 599
In-situ As-P exchange monitoring in metal-organic vapor phase epitaxy of InGaAs/InP heterostructure by spectroscopic and kinetic ellipsometry
S. Sudo, Y. Nakano, M. Sugiyama, Y. Shimogaki, H. Komiyama and K. Tada 604
Real-time growth monitoring of InGaAs/InP-HBT structures with reflectance anisotropy spectroscopy
M. Arens, P. Kurpas, P. Ressel and M. Weyers 609
Real-time optical characterization of GaP heterostructures by p-polarized reflectance
N. Dietz and K. Ito 614
Ellipsometric and reflectance-anisotropy measurements on rotating samples
K. Haberland, O. Hunderi, M. Pristovsek, J.-T. Zettler and W. Richter 620

Chapter 8. Infrared and Ultraviolet Spectroscopic Ellipsometry
Spectroscopic ellipsometry in the infrared range*
B. Drévillon 625
High accuracy IR ellipsometer working with a Ge Brewster angle reflection polarizer and a grid analyzer
M. Luttmann, J.-L. Stehle, C. Defranoux and J.-P. Piel 631
Far infrared ellipsometry using synchrotron radiation: the out-of-plane response of $La_{2-x}Sr_xCuO_4$
R. Henn, C. Bernhard, A. Wittlin, M. Cardona and S. Uchida 642
Far infrared ellipsometric measurements of $(GaAs)_n/(Al_xGa_{1-x}As)_n$ superlattice films by means of synchrotron radiation
E. Wold, J. Bremer, O. Hunderi and B.-O. Fimland 649
Ellipsometric study of Fano resonance in heavily doped p-type Si and SiGe alloys
J. Humlíček 656
Application of IR variable angle spectroscopic ellipsometry to the determination of free carrier concentration depth profiles
T.E. Tiwald, D.W. Thompson, J.A. Woollam, W. Paulson and R. Hance 661
Infrared free carrier response of $In_{0.15}Ga_{0.85}As_{0.17}Sb_{0.83}$ epilayers on GaSb
P.G. Snyder, T.E. Tiwald, D.W. Thompson, N.J. Ianno, J.A. Woollam, M.G. Mauk and Z.A. Shellenbarger 667
Application of infrared Fourier transform phase-modulated ellipsometry to the characterization of silicon-based amorphous thin films
A. Canillas, E. Pascual, J.L. Andújar, J. Campmany and E. Bertran 671
Visible and infrared ellipsometry study of ion assisted SiO_2 films
D. Souche, A. Brunet-Bruneau, S. Fisson, V. Nguyen Van, G. Vuye, F. Abeles and J. Rivory 676
Infrared and UV-visible ellipsometric study of WO_3 electrochromic thin films
E. Pascual, J. Martí, E. Garcia, A. Canillas and E. Bertran 682
Infrared ellipsometry of LiF
J. Humlíček 687
Optical investigations of mixed-phase boron nitride thin films by infrared spectroscopic ellipsometry
M. Schubert, E. Franke, H. Neumann, T.E. Tiwald, D.W. Thompson, J.A. Woollam and J. Hahn 692
In situ characterization of cubic boron nitride film growth in the IR spectral region
K.-L. Barth, W. Fukarek, H.-P. Maucher, M.F. Plass and A. Lunk 697
In situ infrared ellipsometry study of the growth of hydrogenated amorphous carbon thin films
T. Heitz and B. Drévillon 704
Infrared ellipsometric analysis of organic film-on-substrate samples
A. Röseler and E.-H. Korte 708
IR ellipsometry studies of polymers and oxygen plasma-treated polymers
C.L. Bungay, T.E. Tiwald, D.W. Thompson, M.J. DeVries, J.A. Woollam and J.F. Elman 713
Determination of the mid-IR optical constants of water and lubricants using IR ellipsometry combined with an ATR cell
T.E. Tiwald, D.W. Thompson, J.A. Woollam and S.V. Pepper 718
Infrared spectroscopic ellipsometry for residual water detection in annealed sol-gel thin layers
S. Bruynooghe, F. Bertin, A. Chabli, J.-C. Gay, B. Blanchard and M. Couchaud 722
Non-destructive optical characterization of chromium conversion layers on aluminium
T. Schram, J. De Laet and H. Terryn 727

* Invited paper

The optical constants of metallic island films as used for surface enhanced infrared absorption
A. Röseler and E.-H. Korte ... 732
In situ infrared spectroscopic ellipsometry for blanket aluminum chemical vapor deposition on TiN and on SiO_2/Si
M. Weidner, G. Weidner, A. Hausmann and G. Ritter ... 737
Deep ultra-violet measurements of SiON anti-reflective coatings by spectroscopic ellipsometry
C. Defranoux, J.-P. Piel and J.-L. Stehle ... 742
Spectroscopic ellipsometry measurements of $Al_xGa_{1-x}N$ in the range 3–25 eV
T. Wethkamp, K. Wilmers, N. Esser, W. Richter, O. Ambacher, H. Angerer, G. Jungk, R.L. Johnson and M. Cardona ... 745
Ellipsometry in the extreme ultraviolet region with multilayer polarizers
M. Yamamoto and M. Furudate ... 751

Chapter 9. Spectroscopic Ellipsometry in Chemistry, Biochemistry, and Electrochemistry
An anisotropy microellipsometry (AME) study of anodic film formation on Ti and Zr single grains*
A. Michaelis and M. Schweinsberg ... 756
Spectroscopic ellipsometry and biology: recent developments and challenges*
H. Arwin ... 764
Spectroscopic ellipsometry of electrochemical precipitation and oxidation of nickel hydroxide films
F. Kong, R. Kostecki, F. McLarnon and R.H. Muller ... 775
A study of quantitative electrochemical analysis through a spectroellipsometric technique with a new function
Z.Q. Huang, S.T. Zhang, C.G. Chen, S.F. Xie, Y.R. Yang and W. Zhu ... 781
Ellipsometric model for two-dimensional phase transition in Langmuir monolayers
A. Tronin and V. Shapovalov ... 785
Anisotropy in Langmuir–Blodgett films studied by generalized spectroscopic ellipsometry
B. Lecourt, D. Blaudez and J.M. Turlet ... 790
Spectroscopic ellipsometry of fullerene embedded Langmuir–Blodgett films with surface plasmon excitation
E. Bortchagovsky, I. Yurchenko, Z. Kazantseva, J. Humlíček and J. Hora ... 795
Application of time-resolved spectroellipsometry to the study of liquid crystal reorientation dynamics
T. Fukazawa, T. Tadokoro, H. Toriumi, T. Akahane and M. Kimura ... 799
Glass transition temperature and thermal expansion behavior of polymer films investigated by variable temperature spectroscopic ellipsometry
O. Kahle, U. Wielsch, H. Metzner, J. Bauer, C. Uhlig and C. Zawatzki ... 803
Ellipsometric investigation of thick polymer films
K. Forcht, A. Gombert, R. Joerger and M. Köhl ... 808
Characterization of biaxially-stretched plastic films by generalized ellipsometry
J.F. Elman, J. Greener, C.M. Herzinger and B. Johs ... 814
Investigation of layered microdroplets using ellipsometric techniques
M. Voué, J. De Coninck, S. Villette, M.P. Valignat and A.M. Cazabat ... 819
Protein adsorption in thermally oxidized porous silicon layers
S. Zangooie, R. Bjorklund and H. Arwin ... 825
Ellipsometric penetration of turbid media: depolarization and surface characterization
M.P. Silverman and W. Strange ... 831

Author Index of Volumes 313–314 ... 836
Subject Index of Volumes 313–314 ... 838

* Invited paper

For more information on *Thin Solid Films*, please visit our website which is accessible via the Elsevier Surfaces & Interfaces HomePage at: http://www.elsevier.nl/locate/surfaces